

International Harmonized Research Activities (IHRA)

Biomechanics Working Group

Final Minutes of Meeting held at ACTS, Sailuf, Germany July 12, 1999

Attendees:

Rolf Eppinger	Chair / NHTSA
Dainius Dalmotas	Transport Canada/Canada
Dominique Cesari	INRETS/EU/EEVC
Keith Seyer	FORS/Australia
Risa Scherer	WorldSID Task Group
Toru Kiuchi	OICA/ Japan
Hideki Yonezawa	JMOT/ Japan
Takahiko Uchimura	JAMA (observer)
Kazuhito Asakawa	JAMA (observer)
Haruo Ohmae	JARI (observer)
Michiel van Ratingen	TNO/ EEVC
Steve Rouhana	GM/ USA
Suzanne Tylko	Transport Canada/ Canada

Opening of Meeting:

A status report for the Biomechanics Working Group was presented to the steering committee June 24, 1999 in Geneva.

The steering committee is expecting a final report in November.

Review of Previous Minutes:

Draft minutes for the meeting held May 15, 1999 in Kyoto Japan were distributed by Dainius Dalmotas.

Amendment: Section 5 Injury Criteria Review

Closing sentence should read "Consideration will be given to the ISO Working Group 6 output" as requested by D. Cesari.

Corrections: Attendance & Address list

The name entry for Mr. Yanagisawa should be listed as Mr. Harushige Yanagisawa.

Minutes were accepted as amended.

Presentations:

1. Anthropometry

Keith Seyer presented summary tables of anthropometric distributions derived from the Jurgens database, desegregated by sex and percentile group (5th, 50th, 95th percentiles) **Doc #99-09**. The Jurgens database, (currently referenced by the EVC) contains anthropometric data from 20 geographical regions and accounts for secular trends to the year 2000.

- ◇ Confidence intervals were not be calculated due to the extent of extrapolation used to fill in missing data;
- ◇ Body mass was not included as a parameter.

Mr. Seyer compared:

- Unweighted mean percentile values by sex across 20 geographical regions;
- Mean percentile values by sex weighted by regional population;
- Unweighted mean percentile values by sex across 10 geographical regions containing OECD countries;
- Mean percentile values by sex across 10 geographical regions containing OECD countries weighted by population;
- Mean percentile values by sex across 10 geographical regions containing OECD countries weighted by road fatality rate.

Discussions ensued pertaining to the significance of observed differences and the need for a robust argument to support and /or rationalize any proposed changes.

It was agreed that Michiel van Ratingen (TNO) would input selected parameters from the Jurgen data into the Ramses programme and proceed as follows:

1. A weighting factor will be derived based on the proportion of population groups in Jurgen's raw data (currently in-house at TNO);
2. This weighting factor will then be applied to the existing population groups in the Ramses data set consisting of German data n=6000, Japanese data n=6000, and US/ Canadian data n=6000;
3. Mass and sitting height values from the Jurgen database will be entered as input to the Ramses programme to generate a full complement of anthropometric parameters for comparison with Jurgen's data and current dummy anthropology;
4. Model output will be sent to the Chair & distributed to members for discussion and comments;
5. Anticipated time for completion of the exercise is approximately one week. Mr. van Ratingen will pursue this task upon his return to TNO.

2. WorldSID Update

Risa Scherer provided an update on the WorldSID project.

The design team held an initial kick-off meeting at FTSS. and is meeting the afternoon of July 12 '99.

Revised proposals for the shoulder / thorax and abdomen are expected to be presented at the WorldSid Task Group meeting July 13, 1999.

Design specifications are expected to be frozen at this time.

The task group is anxiously awaiting the anthropometry results.

3.- Field Accident Data

A copy of the SID2000 draft report (**DOC # 99-10**) was provided to Mr. Dalmotas by Mr. van Ratingen for his review. Volvo side airbag cases still need to be added.

Copies of the report will be distributed to committee members by Dainius Dalmotas.

4.- Biomechanical Data

Rolf Eppinger emphasized that the greatest responsibility lies in dummy load fidelity.

Head:

Input from members was requested to help set priorities for planned cadaver testing at the University of Wisconsin later this year. Critical loading regions on the head need to be defined. Data from the Wisconsin test series is expected by the end of the year.

Neck:

Predominant role is in the proper positioning of the head.

Biofidelity in frontal flexion / extension should be included if possible.

Discussion:

Mr. van Ratingen reminded members that TNO needs to know what corridors should be met (NBDL data still needs to be reviewed by TNO).

Rolf Eppinger advised that members of the working group will have to answer the question of appropriate corridors to be met; suggestions regarding recommended method to process time histories are also needed.

Risa Scherer suggests that the Alpha prototype be run through 9790 as a starting point with additional tests being included if necessary; WorldSid will run ISO tests then IHRA can run its tests.

Dominique Cesari reminded the group of the importance of having IHRA oversee all tests (8 sets). The priorities of the working group must remain independent.

Rolf Eppinger commits to providing a preliminary set of requirements to be distributed among members for comment. The document will be finalized at the September meeting.

The process was accepted by all members.

5.- Injury Criteria Review

Dominique Cesari has not received any contributions to date.

ISO WG6 documents i.e., document no. 463 Pelvis, no. 480 Thorax, no. 492 Abdomen & Thorax have been reviewed and will be used to set injury risk curves.

At this time it is not clear how one can proceed to develop a single set of injury risk functions for a specific body region.

The AIS ≥ 3 injury risk function for thoracic deflection is different for the impactor test and the sled test. These differences must be addressed.

Biomechanical references are lacking for the head, neck and thigh, contributions are needed. Arm repeatability is also a problem.

Discussion

Rolf Eppinger favors sled testing stating that the energy transfer observed in sled testing is closer to what is actually seen in vehicles. The thoracic and abdominal injury criteria are currently being examined by NHTSA.

D.Cesari has started preparing a report describing injury functions for the pelvis, abdomen and thorax.

The near side vs. far side issue needs to be revisited. Originally, focus was to be near side only but there may be a need to have simultaneous right and left side measurement capabilities.

Each major region should bring forth their requests.

6.- Other Business

A document prepared by Bud Mertz of GM (**DOC 99-11**) was distributed to members by Steve Rouhana.

Bud Mertz has inquired as to the authorship of the IHRA document. Rolf Eppinger explained that while the document would be reviewed by others the document would be authored by government bodies.

Discussion re. the benefits of sled vs. pendulum tests

Dainius Dalmotas does not believe that the sled test is more realistic than the pendulum test. He explained that within the accident environment concentrated loads are created. Therefore there is a definite need to supplement sled tests with localized loading.

Rolf Eppinger stated that this is the intention however, the pendulum test can be shown to have different energy transfers. The sled test with a pelvic lead should address the localized load deficiency.

Mr Dalmotas agrees that the sled modifications are improvements. However both sled and pendulum tests are required if the dummy is to respond in a realistic fashion.

Keith Seyer agrees that both sled and pendulum tests are required.

Rolf Eppinger questioned whether the modified sled tests would be redundant if pendulum tests were also included. If a pendulum test employs a 6" diameter impactor what size offset plate would be sufficient to represent the pendulum test ?

Risa Scherer reminded the members that repeatability is better with the pendulum test.

Dominique Cesari explained that the impactor provides continuous localized loading while the sled creates momentary localized loading. He favors the sled test as a priority. Drop tests should have the lowest priority.

Rolf Eppinger concluded the discussion by suggesting that he prepare a set of specifications derived from sled tests, for circulation among members. Members are asked to include justifications with their submission.

Discussion of response corridors:

A brief discussion was held concerning the merits of including severe/ catastrophic injury versus non-injury in the response corridors. No consensus was reached.

Next Meeting(s)

It is anticipated that the next meeting of the WG would be held in Lyon on or about September 27-28, 1999 and in San Diego on or about October 28, 1999.

All representatives were reminded to resubmit all relevant documents previously tabled to the Secretary so that proper document numbers can be assigned.

Close of Meeting

International Harmonized Research Activities (IHRA)

Biomechanics Working Group

List of Delegates

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List of Documents

All delegates are reminded that any documents previously tabled should be resubmitted to the Secretary so that they can be filed and numbered.